



**Nebraska Public Power District**

*'Always there when you need us'*

NLS2007053

July 16, 2007

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555-0001

Subject: Licensee Event Report No. 2007-004-00  
Cooper Nuclear Station, NRC Docket 50-298, DPR-46

Dear Sir or Madam:

The purpose of this correspondence is to forward Licensee Event Report 2007-004-00.

Sincerely,

Michael J. Colomb  
General Manager of Plant Operations

/em

Enclosure

cc: Regional Administrator w/enclosure  
USNRC - Region IV

NPG Distribution w/enclosure

Cooper Project Manager w/enclosure  
USNRC - NRR Project Directorate IV-1

INPO Records Center w/enclosure

Senior Resident Inspector w/enclosure  
USNRC - CNS

SORC Administrator w/enclosure

SRAB Administrator w/enclosure

CNS Records w/enclosure

**COOPER NUCLEAR STATION**

P.O. Box 98 / Brownville, NE 68321-0098

**Telephone:** (402) 825-3811 / **Fax:** (402) 825-5211

www.nppd.com

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NR

Correspondence Number: NLS2007053

The following table identifies those actions committed to by Nebraska Public Power District (NPPD) in this document. Any other actions discussed in the submittal represent intended or planned actions by NPPD. They are described for information only and are not regulatory commitments. Please notify the Licensing Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITMENT NUMBER	COMMITTED DATE OR OUTAGE
None		

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

## 1. FACILITY NAME

Cooper Nuclear Station

## 2. DOCKET NUMBER

05000298

## 3. PAGE

1 of 4

## 4. TITLE

Manual Reactor Trip due to Hydraulic Control Unit Valve Bonnet Leak into Reactor Building

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED																																					
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10. POWER LEVEL																																														
50																																														

## 12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME

Paul V. Fleming, Licensing Manager

TELEPHONE NUMBER (Include Area Code)

(402) 825-2774

## 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
	AA	ISV	Dresser	Y					

## 14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete EXPECTED SUBMISSION DATE). ☒ NO

## 15. EXPECTED

SUBMISSION  
DATE

MONTH

DAY

YEAR

## 16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On 5/19/2007 at 00:25 CDT, Cooper Nuclear Station (CNS) was in Mode 1 at 50% Power in Single Loop Operation when a small water leak developed from a Control Rod Drive Hydraulic Control Unit (HCU) directional control valve (DCV) during maintenance. The leak degraded to the point of a visible steam plume, and prompted a precautionary Reactor Building evacuation. After several unsuccessful attempts to isolate the leak operators made the conservative decision to remove the unit from service. At 02:12 CDT, the operators manually scrambled the reactor. Control rods inserted normally. A Group 2 Primary Containment isolation signal isolated required systems. The scram was uncomplicated with systems functioning as required. No off-site releases occurred due to the HCU valve leak which stopped after the scram. The manual scram and controlled shutdown were not nuclear risk significant. Leakage past a manual isolation valve is the most probable direct cause of the DCV internal pressure. The cause of the leak was that tag-out implementation and acceptance for maintenance did not require verification that HCU was de-pressurized, nor were contingencies in place if it was not. Corrective actions are being tracked in CNS's corrective action program.

# LICENSEE EVENT REPORT (LER)

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17. NARRATIVE (If more space is required, use additional copies of Form 366A)

## PLANT STATUS

Cooper Nuclear Station (CNS) was in Mode 1, Power Operation, at 50% Reactor Power in Single Loop Operation at the start of this event.

## BACKGROUND

The Control Rod Drive (CRD) Hydraulic System [EIS:AA] supplies and controls pressure and flow to and from the CRDs. One supply subsystem supplies water to hydraulic control units (HCUs) [EIS:HCU] at the correct flow. Each HCU controls the water flow to and from its associated CRD during normal operation and reactor scram. Each HCU furnishes pressurized water, on signal, to a CRD for normal operation or a scram. The drive then positions its control rod as required. The water discharged from the drives during a scram flows through the HCUs to the scram discharge volume (SDV). The water discharged from a drive during a normal control rod positioning operation flows through its HCU and into the exhaust header.

The Reactor Manual Control System [EIS:DCC] supplies scram and normal control rod positioning signals to the HCU. The basic components in each HCU are manual, pneumatic, and electrical valves; an accumulator; related piping; electrical connections; filters; and instrumentation.

Each HCU has 4 Directional Control Valves (DCVs) [EIS:FSV] that are solenoid-operated valves to direct or exhaust water to or from its respective CRD drive piston. The HCU Insert Supply DCV (CRD-V-123) opens on a CRD insert signal. The valve supplies drive water to the bottom side of the associated CRD piston. The HCU Insert Exhaust DCV (CRD-V-121) also opens by solenoid on an insert signal. The valve discharges water from above the associated CRD piston to the exhaust water header.

The HCU Withdraw Supply DCV (CRD-V-122) is solenoid-operated and opens on a withdraw signal. The valve supplies drive water to the top of the associated CRD piston. At the beginning of the CRD withdrawal sequence the CRD is given a short insert signal, actuating the DCVs associated with rod insertion to unlatch the CRD collet fingers. The solenoid-operated Withdraw Exhaust DCV (CRD-V-120) opens on a withdraw signal and discharges water from below the associated CRD piston to the exhaust header. It also serves as the settle valve. The valve opens, following any normal drive movement (insert or withdraw), to allow the control rod and its drive to settle back into the nearest latch position.

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**17. NARRATIVE** (If more space is required, use additional copies of Form 366A)

**EVENT DESCRIPTION**

On the evening of 5/18/2007, Cooper began a scheduled down power to accomplish required preventive and corrective maintenance, including replacement of DCVs on three CRD HCUs. HCU 26-27 was hydraulically isolated for maintenance. The plant was in a single recirculation loop configuration to perform corrective maintenance on 'A' Recirculation Motor Generator [EIS:AD]. A single reactor feed pump (RFP) [EIS:SJ] was in operation for corrective maintenance to the 'A' RFP lube oil system.

At approximately 00:25 CDT on 5/19/2007 reports from the field indicated that, when maintenance had loosened the flange bolts, a small water leak had developed from the body to bonnet seal of CRD-V-122 for HCU 26-27. The manual isolation valves for the HCU were already closed to isolate the components being worked. However, due to seat leakage past one or both of the manual isolation valves, the leakage continued and degraded to the point that a visible plume of steam was issuing from CRD-V-122, and as a precaution, the Control Room Supervisor (CRS) evacuated the Reactor Building [EIS:NG] at 01:25 CDT.

After several unsuccessful attempts to isolate the leak, operators made the conservative decision to remove the unit from service. At 02:00 CDT, the CRS entered the station reactor scram procedure and started the preparation steps of transferring electrical loads to the startup transformer [EIS:EB]. At 02:12 CDT, the reactor was manually scrammed. Control rods inserted normally. A Group 2 containment isolation signal [EIS:JM] was received at a low reactor water level of 3" above instrument zero, and isolated required systems from the Primary Containment [EIS:NH]. The leak into the Reactor Building stopped after the reactor was scrammed.

During the recovery, the running RFP was manually tripped at 50" above instrument zero in accordance with station procedures due to high reactor pressure vessel (RPV) level conditions. 'B' RFP was restarted when conditions permitted and was used to control RPV level. RPV pressure was controlled by the turbine bypass valves rejecting heat to the main condenser. Radiological conditions were assessed, and a repair and recovery plan was implemented. The scram was characterized as uncomplicated and systems functioned as required. No off-site releases occurred due to the HCU valve leak.

**BASIS FOR REPORT**

This report is required per 10 CFR 50.73(a)(2)(iv)(A), as an event or condition that resulted in manual or automatic actuation of the Reactor Protection System and a valid actuation of a containment isolation system. In Event Notification #43375, CNS

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17. NARRATIVE (If more space is required, use additional copies of Form 366A)

reported this under 50.72(b)(2)(iv)(B) as a 4 Hour (Hr) Emergency Notification System (ENS) Notification and under 50.72(b)(3)(iv)(A) as an 8 Hr ENS Notification.

## SAFETY SIGNIFICANCE

The manual scram and controlled shutdown that resulted from the leak in HCU 26-27 was not a nuclear risk significant event. Mitigating equipment responded as expected. The leak did not impact functionality of any equipment and stopped after the plant shutdown. Therefore, this event resulted in negligible change in core damage frequency.

## CAUSE

The root cause was that neither the Clearance Order (i.e. Tag-Out) implementation, nor the acceptance of the system for maintenance required explicit, positive verification that the system energy source was isolated, and neither process identified contingency actions in case the system was still pressurized. Leakage past one of the manual isolation valves (CRD-V-101) is the most probable direct cause of the pressure persisting internal to CRD-V-122 (HCU 26-27).

**CORRECTIVE ACTION** – The following actions are being tracked in the CNS Corrective Action Program.

- A. Revise the Clearance Order process to require verification of hazardous, off-normal, mode changed, or unusual system isolation prior to system release for maintenance, and to include identified contingency actions in case the system energy source cannot be isolated. Include maintenance verification by positive actions that the isolated system energy has been removed.
- B. Inspect CRD-V-101(HCU 26-27) to determine if there is any mechanical degradation which could explain the leakage associated with this event. Develop and implement corrective actions for leakage based upon the results of the inspection.

## PREVIOUS EVENTS

There have been no reportable events identified in the past 7 years related to HCU leaks.